

**REMARKS**

Applicant notes that the drawings filed on 21 July 2003 have been accepted, and that the Claim for Priority under 35 U.S.C. § 119 has been perfected by receipt of the certified copies of the Priority Document(s). The Examiner objected to the Specification as having an improper Abstract of the Disclosure. Since Applicant has included a substitute Abstract of the Disclosure herewith, this objection can now be withdrawn.

The Examiner additionally objected to the Specification under 35 U.S.C. § 112, ¶ 1, as failing to comply with the enablement requirement. The Examiner alleges that the current detection elements and method are not sufficiently described. Applicant traverses this rejection and respectfully submits that there is adequate information in the Application as filed to enable one skilled in the art to make and use the invention. The invention deals with a three-phase bridge that uses one device for current detection and for thermal sensing. The current detector is the copper track used as a sense resistor, and the thermal sensing is achieved via measurement of elongation of the copper track based on known properties of the metal path.

The Examiner rejected claims 1-5 under 35 U.S.C. § 112, ¶ 2, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. While Applicant traverses the requirements of the Examiner to recite all structural elements needed to determine the current of the motor as well as the method steps used to determine the current, Applicant has amended the claims to obviate the rejection.

The Examiner further rejected claims 1-5 under 35 U.S.C. § 102(b) as being anticipated by Kanouda *et al* (U.S. Patent No. 5,280,228). Applicant traverses this rejection and respectfully submits that the present invention is not and can not be anticipated by Kanouda *et al*.

While Kanouda *et al* and the instant application both deal with current and temperature detection in a three-phase bridge, they achieve these ends in different fashions. In instant claim 1, for example, embodiments comprise a thermal sensor in thermal communication with the

metal path to measure the temperature of the metal path and a temperature of power transistors of the control device. This differs from Kanouda *et al.* since the device of Kanouda *et al.* uses two separate blocks to achieve these ends. The sole function of the thermal sensor of Kanouda *et al.* is to provide a temperature of the power transistors/semiconductors.

In embodiments, Applicant's current detection and temperature detection are achieved with a single device: the copper track used as a sense resistor. Temperature detection of the power semiconductors is achieved because the thermal sensor is placed very near or directly upon, but in thermal communication with, the track used as current sense resistor. Because of the thermal communication, the same sensor can be used also for thermal compensation of the drop in the copper track, which changes its resistance with temperature. By knowing the temperature of the copper track, the control software is able to estimate in real time the actual resistance of the copper track. By measuring the voltage drop on this copper track, the control software can calculate the current flowing in the copper track since resistance,  $R$ , is known and voltage,  $V$ , is measured. This avoids the use of expensive, low tolerance, and low temperature coefficient Current Sense Resistors in the control device.

Besides the thermal sensor giving the temperature of the copper track, it also supplies a coarse measurement of the temperature of the power semiconductors on the IMS control device. This is possible because the IMS technology has very low thermal resistance. Thus, the temperature of the copper track is roughly identical to the temperature of the power semiconductors. In addition, the copper track is made with a photoengraving process that is very inexpensive.

\*\*\*\*\*

In view of the foregoing remarks, the subject application is believed to be in condition for allowance. Therefore, further consideration and allowance of the subject application is requested. If the Examiner considers personal contact advantageous to the disposition of this case, please call Applicant's Attorney, David E. Henn at (585) 325-4618, SHLESINGER & FITZSIMMONS, Rochester, New York 14604, or fax him at (585) 232-5997.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'David E. Henn', is written over a horizontal line.

SHLESINGER & FITZSIMMONS

By: David E. Henn  
Attorney for Applicant  
Registration No. 37,546

DEH/kmh